

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
14 February 2002 (14.02.2002)

PCT

(10) International Publication Number
WO 02/13093 A2(51) International Patent Classification⁷: G06F 17/60

(21) International Application Number: PCT/US01/23588

(22) International Filing Date: 26 July 2001 (26.07.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/632,574 4 August 2000 (04.08.2000) US

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GI, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with declaration under Article 17(2)(a); without abstract;
title not checked by the International Searching Authority

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SYSTEM AND METHOD FOR DYNAMICALLY DEFINING MARKETPLACES AND FACILITATING PEER-TO-PEER EXCHANGES

(57) Abstract:

WO 02/13093 A2

SYSTEM AND METHOD FOR DYNAMICALLY DEFINING MARKETPLACES AND FACILITATING PEER-TO-PEER EXCHANGES

Background of the Invention

5 1. Field of the Invention

The present invention generally relates to global electronic commerce and more specifically relates to facilitating peer-to-peer transactions using dynamically defined marketplaces and dynamically created distributed exchanges convening over a global communications network.

10 2. Related Art

The exchange of information, particularly that which relates to ecommerce, continues to grow rapidly. The commercial aspects of global electronic networks such as the Internet have seen the rise of network-based marketplaces that bring together isolated parties so that they may collectively participate in mutually
15 beneficial transactions. Presently, these marketplaces range in size and scope from individual marketplaces to large centralized sites that collate information from affiliate sites. Additionally, intelligent searching software programs may also create temporal marketplaces.

Despite the seemingly prolific success of many of these conventional
20 marketplaces, current methods of electronic commerce inherently contain significant hindrances to market growth. A significant disadvantage of these conventional systems is their static nature, rigid predefined market segments, and their usual reliance on a centralized computer system. For example, critical elements such as who may participate in a marketplace, how they operate, and how they transact
25 business are typically predefined before a participant joins and existing marketplace. Additionally a centralized computer system typically must manage the connections for each of the ever increasing number of participants as well as manage the transactions between parties.

A particularly good example of these disadvantages are exemplified by today's auction sites. Sites such as Ebay employ a centralized computer system to manage the exponentially multiplying number of items held for auction. Ebay must maintain a centralized computer system to handle each of the connection requests necessary for the isolated parties to participate in commercial transactions. Additionally, Ebay predefines the parameters of the marketplace, from the length of auctions, to how the interaction between sellers and bidders occurs.

Aggregation auction sites, such as Auction Watch, have recently made an attempt at acquiring a portion of the lucrative auction market. Typically, this type of site must also maintain a centralized computer system for managing the items being auctioned and the connections with participating parties. An aggregate auction site must also burden its centralized system with the task of constantly querying the most popular auction sites and collating the results into a central database for perusal and inspection by potential customers.

In addition to auction sites there are individual marketplaces of fixed price goods from providers such as Half.com. The individual marketplace is the most prevalent market vehicle on the Internet. Generally set up by a company or solo vendors, this type of site allows patrons to view and purchase goods. Although companies have complete control over the merchandise displayed on their Web pages, information on merchandise and services tends to be static, and therefore contributes to the inefficient manner in which customers are informed about changes in products or services. Additionally, the goods available through fixed price providers are typically limited in nature, with rigid predefined market segments such as music, books, movies, and games. Furthermore, these fixed price goods providers necessarily employ a centralized computer system to manage inventory and transactions, thereby requiring that participants unilaterally accepts the terms and conditions set forth by these providers.

A subset of the fixed price providers are the digital goods providers that facilitate the acquisition and/or selling of digital files, information, or other electronic items. Napster is an example of one such service. Although the location of the goods brokered by Napster may be distributed, Napster must still maintain a centralized database of files that are available. Additionally, Napster must provide

centralized searching of its distributed inventory. Thus, the goods available through digital goods providers are static in nature, with rigid predefined market segments such as music, computer games, and the like. Furthermore, Napster suffers from the additional drawback that it only facilitates transactions dealing directly with MP3 files.

Gnutella is another service that is also afflicted by its limitation to digital goods. In fact, Gnutella is further restricted to the anonymous exchange of computer files. Although Gnutella is a peer-to-peer file sharing program that has moved away from the limitations imposed by a centralized computer system that manages its services, it is restricted by its limited anonymous interaction and predefined operations.

Gnutella employs a very inefficient brute force search method in which each search is sent by the originator to other, already known Gnutella clients. Each of these clients then passes the query along to each Gnutella client known by it, and so on down the line. For practical reasons, the exponentially expanding chain of querying is limited to three generations, which similarly limits the probability of finding unique items. Subsequent file transfers, if an item does happen to be found, use an anonymous file transfer client.

Other examples of limited peer-to-peer systems are the ICQ (I seek you) service and America On-Line's Instant Messenger service. Each of these services allow users to find other participants through a central server while both parties are simultaneously connected to the network. Once identification and contact is established through the central server, a direct peer-to-peer communication can be initiated. However, these services are merely for chatting amongst participants and typically have no commercially redeeming value. In some instances, a chat session may lead to the transfer of digital goods, however, messaging services are not optimized to facilitate this aspect.

In addition to the above described consumer marketplaces, business to business marketplaces suffer from the same problems. These types of sites necessarily employ predefined marketplaces that are static in nature and rigid in structure. In some instances, similar to Napster, although the inventory or information about available items may be somewhat distributed, business to business

marketplaces still rely on a centralized computer system for searching and inventory management.

Search agents are an alternative to consumer and business auction sites, fixed price providers, and digital goods providers that may be employed by participants in a network based commercial environment. These search agents are typically computer programs that visit as many areas as possible on a network, constantly seeking the particular goods desired by the user employing the agent.

Search agents are generally written by various authors whom do not follow any defined standards in their searching techniques. Similarly, the directories and web sites that are searched similarly also do not employ any defined standards that may bring a user closer together with the desired goods. Furthermore, if history is instructive in analyzing today's computer resource-usurping agents (and their insatiable appetite for bandwidth) such agents may eventually be banned by electronic networks. Finally, the use of multiple separate searching agents by multiple separate individuals is redundant and extremely inefficient in today's commercial environment where network resources can be at a premium.

Therefore, what is needed is a system and method that overcomes these significant problems found in the conventional systems as described above.

Summary of the Invention

A system and method is presented that provides peer-to-peer exchanges between entities with complementary interests in dynamically defined marketplaces. Complementary interests in a dynamically defined marketplace may be identified by a facilitation server. The facilitation server may receive marketplace definitions that have been created by entities desiring to find other entities with a complementary interest in the marketplace.

Marketplace definitions may be based upon an organized system for categorizing goods, services, and information. Marketplace definitions may include desired actions such as to sell or purchase goods, as well as requirements for participating entities and their corresponding peer programs. The facilitation server may match the marketplace definitions of two or more entities and provide contact information so that the two or more entities may subsequently initiate a peer-to-peer

exchange. Additionally, the facilitation server may provide dynamic pairings of entities and their peer programs' abilities and functions.

5 A computer implemented peer program may be executed by an entity desiring to create or participate in a dynamically defined marketplace. The peer program may allow an entity to define one or more marketplaces of interest to the entity. Additionally, the peer program may facilitate the creation of an entity profile that describes certain characteristics of the entity. The peer program may also facilitate the creation of a peer program profile that describes certain characteristics and abilities of the peer program. The peer program may send the definition of one or more marketplaces, along with the entity profile and the peer program profile, to the facilitation server for matching in the search for an exchange.

10 Furthermore, the peer program may receive contact information from the facilitation server when complementary dynamically defined marketplaces are matched and an exchange is created. The contact information may allow a peer program to directly contact the peer program(s) representing one or more entities with a complementary interest in a particular dynamically defined marketplace. Successfully contacting a peer program allows the entities represented by those peer programs to interact and establish a dynamic peer-to-peer exchange.

15 A dynamic peer-to-peer-exchange may be enabled by providing participating peer programs with a common system for the exchange of data, information categorization, and information classification. This system may include a universal classification system that categorizes information for a common reference library of codes, identifications, and definitions that may be utilized by a peer program. A dynamic naming convention for peer programs may enhance the ability to find and associate various peer programs with a particular entity.

20 A common system of definitions and rules for peer program actions may enable the interaction of peer programs participating in an exchange. Actions may include querying a peer program, initiating communication, and exchanging information. Further, the facilitation server may maintain profile information about an entity independent of its peer program. This may enable an entity to maintain a permanent profile and presence that may be dynamically linked to various peer programs as they are created or as they change network addresses.

The definition and establishment of groups may enable entities to be linked or associated to other entities that share a specific relationship. The specific relationship may be membership in a common organization, enrollment at the same university, or a shared interest, such as coin collecting. An entity's profile may be
5 linked to one or more groups associated with the entity. For example an entity may link to a group defined by shared membership in a trade organization. This association may facilitate the definition and creation of marketplaces based on groups. Thus the inclusion of the group parameter in defining a dynamic marketplace may provide the particular defining attribute of a desired marketplace
10 and thus be invaluable.

Exchanges may be further facilitated through a rating system and third party reference depository of information. This system may allow an entity to rate another entity on a numeric scale or other type of scale and include the ability to attach comments. A rating for an entity may be compiled and averaged from the total
15 ratings, or from a subgroup of the total ratings.

Such a system and method for dynamically defining a marketplace and facilitating peer-to-peer exchanges may, as outlined above, change the way the Internet works by decreasing its role as a repository of information and increasing its role as a conduit that allows parties to interact and exchange information
20 dynamically. New peer-to-peer technology is the catalyst that may eventually change how people use the Internet, perhaps as profoundly as did the World Wide Web. Strangely enough, the new peer-to-peer Internet may work much the same as the pre-Web Internet, when it was the province of academics, computer aficionados, and the military. In those early days, users of the Internet would typically launch
25 fetching programs to go out and grab files from remote databases. With Mosaic, which blossomed into Netscape, the Internet spawned the World Wide Web, which has worked like a giant bulletin board allowing any party to make accessible any type of information ranging from stock tips to baseball trading cards. The peer-to-peer nature of the new technology as embodied in the present invention may
30 ultimately allow the Internet to once again be a medium where information is mined directly from person to person, except this time it will be for the masses.

Brief Description of the Drawings

The details of the present invention, both as to its structure and operation, may be gleaned in part by study of the accompanying drawings, in which like reference numerals refer to like parts, and in which:

5 **Figure 1** is a top level block diagram illustrating an example of entities participating in a dynamic distributed marketplace according to an embodiment of the present invention;

10 **Figure 2** is a block diagram illustrating an example of peer-to-peer communication and exchange between several entities in a dynamic distributed marketplace according to an embodiment of the present invention;

Figure 3 is a block diagram illustrating an example of a peer-to-peer exchange between two entities in a dynamic distributed marketplace over an alternative communication channel according to an embodiment of the present invention;

15 **Figure 4** is a block diagram illustrating an example template for a single entity's profile and related marketplace definitions according to an embodiment of the present invention;

20 **Fig. 4A** is a block diagram illustrating an example template for items belonging to a particular marketplace according to an embodiment of the present invention;

Figure 5 is a block diagram illustrating an example profile and related marketplace definitions of an entity participating in a dynamic distributed marketplace according to an embodiment of the present invention;

25 **Figure 5A** is a block diagram illustrating an example marketplace definition and related items of an entity participating in a dynamic distributed marketplace according to an embodiment of the present invention;

Figure 6 is a block diagram illustrating an example profile and related marketplace definitions of an entity participating in a dynamic distributed marketplace according to an embodiment of the present invention;

30 **Figure 6A** is a block diagram illustrating an example marketplace definition and related items of an entity participating in a dynamic distributed marketplace according to an embodiment of the present invention;

Figure 7 is a flowchart illustrating an example process for an entity to dynamically create a marketplace for inclusion in a dynamic distributed marketplace according to an embodiment of the present invention;

Figure 8 is a flowchart illustrating an example process for distributing a dynamically created marketplace according to an embodiment of the present invention;

Figure 9 is a flowchart illustrating an example process for dynamically creating an exchange between two entities with complementary marketplaces in a dynamic distributed marketplace according to an embodiment of the present invention;

Figure 10 is a flowchart illustrating an example process for establishing peer-to-peer interaction between two entities with complementary marketplaces in a dynamically distributed marketplace according to an embodiment of the invention;

Figure 11 is a block diagram illustrating a protocol layering principle widely used in TCP/IP networking environments;

Figure 12 is a flow diagram illustrating a technique for demultiplexing incoming data packets based on a protocol type found in the frame header;

Figure 13 is a flow diagram illustrating a technique for demultiplexing incoming data packets based on a type found in the IP datagram header;

Figure 14 is a flow diagram illustrating a technique for demultiplexing incoming data packets based on a type found in the TCP packet header; and

Figure 15 is block diagram illustrating an exemplary computer system in which elements of the present invention may be implemented according to an embodiment of the invention.

Detailed Description of the Invention

Certain embodiments as disclosed herein provide for a system and method for dynamically defining a marketplace and creating an exchange. For example, one method as disclosed herein allows an entity to define certain characteristics and restrictions of a desired transaction and the participating parties. In doing so, the entity may dynamically define a marketplace for its desired transaction and create an exchange wherein all of the transactional characteristics and participants meet the particular requirements of the entity.

After reading this description it will become apparent to one skilled in the art how to implement the invention in various alternative embodiments and alternative applications. However, although various embodiments of the present invention will be described herein, it is understood that these embodiments are presented by way of example only, and not limitation. As such, this detailed description of various alternative embodiments should not be construed to limit the scope or breadth of the present invention as set forth in the appended claims.

A dynamic exchange, according to one embodiment, may take place between two or more entities with complementary interests in a dynamically defined marketplace. Fig. 1 is a top level block diagram illustrating an example of a plurality of entities participating in a dynamic distributed exchange according to an embodiment of the present invention. Each participating entity may be a corporation, an individual, a group of individuals, a formal or informal association, or the like. Alternatively, a participating entity may be defined as any party having an interest in a marketplace.

For example, any person or group, such as entity 10, entity 20, entity 30, entity 40, entity 50, and entity 60 may take part in a dynamically distributed marketplace and exchange. The following description, for the sake of brevity and clarity, will be illustrated in terms of a single entity where applicable. Particular segments more suitable to adequate depiction by the inclusion of more than one entity will be so described where appropriate.

At the top level, Fig. 1 illustrates each participating entity connected to facilitation server 80 through network 90. Each participant, such as entity 10, may employ a device, such as device 10B, to connect to facilitation server 80. In one embodiment, device 10B may be a personal computer configured to communicate over network 90. Alternatively, device 10B may be a wireless communications device configured to communicate over network 90. Notwithstanding the type of device employed by entity 10, however, a connection between device 10B and facilitation server 80 may be established over network 90.

In one embodiment, peer 10A may establish the connection between device 10B and facilitation server 80. For example, peer 10A may be a computer program created in a general purpose computer programming language. Preferably, peer 10A

may be optimized to run on device 10B. Upon establishing a connection between device 10B and facilitation server 80, peer 10A may direct the communications between entity 10 and facilitation server 80.

Additionally, peer 10A may receive information from facilitation server 80 regarding entities that may have complementary interests in a particular marketplace. For example, entity 40, entity 50, and entity 60 may each have complementary interests in a marketplace dynamically defined by entity 10. Facilitation server 80, upon determining each entity's complementary interest in the marketplace, may provide peer 10A with certain contact information for entity 40, entity 50, and entity 60. Contact information may include, for example, the entity and peer program profile information

In one embodiment, peer 10A may subsequently contact the respective peers of those entities identified by facilitation server 80 as having a complementary interest in a marketplace dynamically defined by entity 10. Fig. 2 is an example of the peer-to-peer communication between a peer and the respective peer's of those entities that have been identified as having a complementary interest in a dynamically defined marketplace. In one embodiment, peer 10A may communicate directly with peer 40A, peer 50A, and peer 60A. This direct peer-to-peer communication may be referred to as an exchange.

An exchange may be comprised of a common system of reference and definitions, paired with a common method of initiating actions. For example, peer 10A may initiate a search at peer 20A, looking for an item in a specific category identified in a common reference library. The protocols to initiate the search and return the resulting information may advantageously be a recognizable predefined standard format.

In one embodiment, peer 10A may receive from facilitation server 80 certain contact information for entity 40, entity 50 and entity 60, once facilitation server 80 has determined each entity's complementary interest in a marketplace defined by entity 10. Upon receiving the contact information, peer 10A may contact peer 40A, peer 50A, and peer 60A to further inquire about the interest of the respective entity. For example, peer 10A may contact peer 40A to further inquire about the particular goods that entity 40 may be interested in. Communication between peer 10A and

peer 40A may use a standard system of references and protocols to facilitate the exchange.

In an alternative embodiment, peer 10A may send a query to the peer program of each entity that was identified by facilitation server 80 as having a complementary interest in the marketplace dynamically defined by entity 10. The query may travel over network 90 to devices 40B, 50B, and 60B. Once the query from peer 10A has been received, the query is passed to the peer for that device (and entity). For example, once the query from peer 10A is received by device 40B, the query is passed to peer 40A for processing. Peer 40A may then respond to the query as directed by entity 40.

In one embodiment, the contact information provided to peer 10A by facilitation server 80 may be the network addresses for device 40B, device 50B, and device 60B. A network address may be in the form of a logical Internet Protocol ("IP") address or a physical Ethernet address. Alternatively, a network address may be in the form of an access number for a wireless communication device. Contact information may include a dynamic peer program domain name that can be resolved to a specific IP address. Such information may enable peer 10A to locate the peer program for entity 40 (peer 40A). Advantageously, although the IP address for peer 40A may change, the dynamic peer program domain name would remain the same.

Communication between a peer program and facilitation server 80 may take place over network 90. Additionally, the direct peer-to-peer communication, or exchange, between peers may take place over network 90. Network 90 may be any sort of communications network such as a global electronic communications network, for example, the Internet. Furthermore, network 90 may be a local area network ("LAN"), a wide area network ("WAN"), or perhaps a wireless communications network. In one embodiment, network 90 may support connections between direct connect devices or wireless devices and facilitation server 80. Moreover, network 90 may be circuit switched such as a telecommunications network or packet switched such as a data communications network.

Facilitation server 80 may be any type of server device capable of accepting connections from a local or remote device. For example, facilitation server 80 may simultaneously accept a remote wireless connection from device 10B, a remote

network connection from device 20B, and a direct (local) physical connection from device 30B.

Furthermore, facilitation server 80 may be equipped with a data area 85 to store information. Data area 85 may be comprised of a volatile memory or a long term memory or some combination of the two. Additionally, data area 85 may include a database configured to store information pertinent to a dynamically defined marketplace and distributed exchange.

Fig. 3 is a block diagram illustrating an example of a peer-to-peer exchange between two entities in a dynamic distributed marketplace over an alternative communication channel. In one embodiment, direct peer-to-peer communication between entity 30 and entity 50 may take place over alternative network 95. Alternative network 95 may be any sort of communications network such as a global electronic communications network, a LAN, a WAN, or a wireless communications network.

For example, as described with reference to Fig. 2, entity 30 may receive contact information for entity 50 after facilitation server 80 has determined that entity 50 has a complementary interest in a dynamically defined marketplace created by entity 30. This contact information may be received by entity 30 over network 90. Entity 30, however, may subsequently contact entity 50 over network 95.

For example, entity 30 may employ mobile computer as device 30B. Communication between peer 30A and facilitation server 80 may take place over network 90 when device 30B is physically connected to network 90, which may be a corporate LAN. After peer 30A has received the contact information for device 50B, peer 30A may disconnect from network 90. Later, device 30B may establish a wireless connection to alternative network 95 so that peer 30A may contact peer 50A for a peer-to-peer exchange.

Fig. 4 is a block diagram illustrating an example template for a single entity's profile and related marketplace definitions. In one embodiment, each entity may have a profile and any number of marketplace definitions. For example, in Fig. 4, entity 10 has entity profile 100, peer profile 102, peer profile 104, and several marketplace definitions. Peer profile 102 may be the first of many peer program profiles that are associated with entity 10. For example, peer profile 104 is the

second peer program associated with entity 10. Additional peer program profiles may also be associated with entity 10. Peer Definition 110 may be the first marketplace definition, with definition 120 and definition 130 being the second and third marketplace definitions. An entity may have zero or a plurality of marketplace definitions, as illustrated by definition 140 that is identified as marketplace n.

5 The information in an entity profile may initially be entered into the peer so that the information may subsequently be sent to the facilitation server. For example, profile 100 may contain certain information relating to entity 10. In one embodiment, profile 100 may include the first name, last name, address, city, state,
10 country, telephone number, cellular telephone number, email address, and an alternate contact for entity 10. The alternate contact, for example, may suggest a preferred method for contacting the entity if the particular peer program does not support some sort of communication function. Additionally, profile 100 may contain a nick name, a default language, group, association, type of entity, rating,
15 and an available peer field for entity 10. The type field, for example, may represent that the entity is a dealer or an individual, or perhaps a non profit organization rather than a for profit corporation.

The ratings field may contain an entity's "score" as judged by other entities. A rating may include numeric or other types of evaluations of an entity. A rating
20 may also include written comments along with information about the entity that supplied the rating. For example entity 10 may be rated by entity 40. This rating may include a numeric rating, a written comment, and a listing of the groups that the entities have in common. This may enable ratings to be compiled overall or by certain characteristics such as the rating for a specific entity made by entities that are
25 members of a particular group. A rating may also be associated with the entity that created it. For example all ratings created by entity 40 may be retrieved and evaluated. Advantageously, a dynamic market definition may require that all participating entities have a positive rating, or a rating that is greater than a specific threshold.

30 An entity's profile may remain persistent in facilitation server 80 and may be dynamically paired with the peer program profiles for each peer program initiated by the entity. For example, facilitation server 80 may maintain an association between

an entity's profile and the profile of each peer program used by the entity. This dynamic pairing of an entity and specific peer programs may provide for the persistence of an entity's profile and identification on the facilitation server while the associated peer programs may change in location, function, capabilities or status

5 (e.g. active and inactive).

In one embodiment, peer programs associated with an entity may utilize a dynamic peer naming system that combines a unique entity domain name with an extension for each peer. For example peer program 10A's domain name may be '10A.Eyestate.com'. A chat peer program associated with peer 10A may be named

10 'Chat.10A.EyeState.com'. Such a naming system may enable entities to request specific peers by name, and have those names resolve to the correct and current IP address for the desired peer.

In one embodiment, group information may include qualities such as geographic location, shared association, type, open or closed, public or private, or a particular interest. For example, a group may be available for entities in the Pacific Northwest. Alternatively, a group may be available for entities that speak Spanish. Another example may be a group of entities that belong to a common trade organization, or professional club. In one embodiment, a group may be open such that any entity may join. On the other hand, a group may be closed. For example, a

15 closed group may have a gatekeeper that is responsible for determining whether or not an entity may join the group. Furthermore, information about the various attributes of a group may be encoded in it's unique identification number.

A group may also be defined as having a certain type. For example, a group may be a non profit group or a for profit group. A group may also be defined as a trading group. Groups may have other attributes such as a date or time when the group is considered active. For example, a trading group of coin dealers may want to restrict trading sessions to the hours of 10am through 2pm, Mondays through Fridays. Alternatively a group may be activated seasonally, for example a hunting season group may be active from September through November.

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Another characteristic of a group may be its declaration as public or private. In one embodiment, a group may be defined as public so that any entity may successfully use the group as an element in its marketplace definition. Alternatively,

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a group may be defined as private so that only members of the group may successfully include the group element in a marketplace definition. In one embodiment, the inclusion of a private group may be ignored by the facilitation server in a marketplace definition created by an entity that is not a member of the
5 specified group.

A peer program profile may include information about the type of peer program that has been initiated by an entity, for example its capabilities or standards. Peer programs may be limited to a specific function such as file transfer, or may additionally include abilities for chat, item searches, encryption, email, and specific
10 transactions to name a few. In one embodiment, specific transactions may include the ability to conduct an auction or the sale of an item. Additionally, a peer program may include the ability to accept credit card payments.

An entity may have multiple peer programs associated with it. For example, an entity may have one peer program dedicated to communication, chat, and instant
15 messaging, which another peer program may be dedicated to auctioning particular items. The association of peer program profiles with an entity profile on the facilitation server 80 may facilitate the peer-to-peer exchange.

Each marketplace definition may also have certain associated information that defines the particular marketplace. In one embodiment, a marketplace definition
20 may have an entity identification, category classification, group identification, transaction desired, geographic and rating restrictions. For example, a desired transaction field may contain an indicator declaring whether the marketplace may be for buying, selling, or trading. Alternatively, a desired transaction field may be any combination of the three. An advantage of the desired transaction element is
25 that it facilitates bringing together entities on each side of a potential transactional.

In one embodiment, peer 10A may receive input from entity 10 that defines a particular marketplace. A marketplace definition may use a standard format for defining and encoding the nature of a marketplace. For example, a marketplace
30 definition may use a universal categorization system that arranges specific types of items in a hierarchical order. Certain characteristics of a marketplace definition may be the type of exchange (e.g. fixed price or auction) and the desired transaction (e.g. purchase, sale, trade). The market definition may also include identification

numbers resulting from a classification for the entity and the functional characteristics and abilities of its peer program. Once peer 10A has received a marketplace definition from entity 10, peer 10A may then contact facilitation server 80 through the network 90 and provide the dynamically defined marketplace to the facilitation server 80.

An entity may additionally specify certain restrictions when defining a marketplace. For example, the marketplace may be restricted to a certain group. Thus, only entities that are members of the identified group may be identified by the facilitation server as having a complementary interest in the marketplace. In one embodiment, restrictions may be based on any characteristic of a marketplace or an entity profile or peer program profile.

In one embodiment, a restriction may be based on time. Advantageously, this may allow a trading group to convene weekly for a few hours. For example, an entity that is a member of the trading group may create a marketplace and restrict its operation to the hours of 2pm – 5pm each Thursday. Furthermore, if the trading group desired to further define the dynamic marketplace, the marketplace may be restricted to only members of the particular group. Moreover, the group may be labeled as closed so that only authorized entities may be allowed entry into the group by a gatekeeper or group administrator.

In one embodiment, a marketplace may be restricted based on the type characteristic of an entity. The type characteristic may identify an entity as being a dealer or a collector in the particular category of goods that is the subject of the marketplace. In one embodiment, a dealer may dynamically define a marketplace for rare coins and restrict that marketplace so that only an entity that is identified in its profile as a collector may participate. This may advantageously restrict competing dealers from participating in the marketplace.

In an alternative embodiment, entity ratings may be used as an defining element in a dynamically defining marketplace. For example, an entity may be included or excluded from participating in a particular marketplace based upon its rating. An entity defining a marketplace may choose to exclude those entities with average ratings below a certain threshold. Alternatively, an entity may choose to exclude those entities that it has previously rated negatively or below a certain

threshold. Furthermore, entities may be excluded based upon the average rating of a particular group or trusted entities.

An additional element of a dynamically defined marketplace may be the use of a particular category for the specific type of goods that is the subject of the marketplace. In one embodiment, categories may be predefined to include a wide range of broad and granular subjects. These subject areas may be organizationally structured from broad categories to granular subcategories that naturally define the subject matter for particular types of goods and services.

In an alternative embodiment, a hierarchical structure of predefined categories may allow real time additions to the structured hierarchy. For example, a category element included in a marketplace may be customizable such that an entity may define a marketplace based on a category that does not already exist in the predefined set of categories. Advantageously, these dynamically defined categories may later be integrated into the hierarchical structure of predefined categories, allowing the facilitation server's database of categories to ultimately reach a critical mass wherein the vast majority of requested categories exist.

In one embodiment a hierarchical classification system for categories may relate particular categories with each other in a parent to child manner. For example, each particular category or area of interest may be assigned a unique identification number and then may be related to a parent category. Accordingly, each category may be assigned any number of child categories that may be subsets, intersecting sets, or the like. A particular category may therefore be directly referenced by its unique identifier, or indirectly referenced by a structured string of unique identifiers assigned to the parental categories of the particular category.

For example, a broad classification may, in one embodiment, be COLLECTIBLES. COLLECTIBLES may be assigned the unique identifier 12. Similarly, a child category of COLLECTIBLES may be COINS, which is assigned the unique identifier 241. Therefore, COINS may be directly referenced by its unique identifier 241, or indirectly referenced by its relative identifier 12.241. Continuing the example, USCOINS may be a child category of COINS and assigned the unique identifier 7122. Therefore USCOINS may be identified as either 7122 or 12.241.7122.

An advantage of this canonical hierarchy is the ability to create specific subcategories by including certain restricting parental categories in a relative identifier. For example, in one embodiment, a broad category may be GOLDCOINS, which is assigned the unique identifier 811. Coins made from gold have been used throughout the ages all over the world. However, including the parental category 7122 extremely restricts the category to those gold coins that were minted in the United States.

Similar to having multiple marketplaces for a particular entity, each marketplace may in turn include a number of entities, each with multiple items. In one embodiment, each marketplace may have one or more items. Alternatively, a marketplace may have no items. For example, a seller's marketplace may have several items for sale while a buyer's marketplace may have no items for sale. However, a buyer's marketplace may include several definitions of items desired for purchase.

Fig. 4A is a block diagram illustrating an example template for items that belong to a particular marketplace. The marketplace is described by definition 110 and may have a unique identifier that is created based on the content of the marketplace. Item 112 may be the first item in the marketplace. In one embodiment, each item may link to the marketplace by use of the marketplace's unique identifier. Additionally, each marketplace may have a plurality of items. For example, item 114, and item 116 may be the second and third items. Item 118 may be the last of any number of additional items in the marketplace, as illustrated by its label as item n.

Each item in a marketplace may have several elements. For example, an item may be described by a title, description, price, status, and a universal category identifier. In one embodiment, the status field may be used to specify whether the item is for sale, purchase, or trade. Additionally, a universal identifier field may be used to represent an identifier associated with the particular type of item, for example a UPC Number for consumer goods or a Scott Catalog Number for stamps. Additional fields may also be defined for any marketplace or category.

Fig. 5 is a block diagram illustrating an example profile and related marketplace definitions of an entity participating in a dynamic distributed

marketplace. In one embodiment, profile 150 may relate to entity 10. Profile 150 may contain certain information about entity 10, for example the name, address, city and state. Profile 150 may additionally contain the type of entity, group, association, email address, and the alternate contact preference for entity 10. For example, entity 10 can be a dealer located in San Diego, California and can be contacted via email at the address cards@sell.com.

Entity 10 may also have several peer programs associated with it and therefore a peer profile for each peer program. Profile 152 is one such peer program profile. A peer program profile, like profile 152, may include certain information about the peer program. For example, the IP address for the peer program may be included, the functional capabilities of the peer program may be included as well as the current state of the peer program. In one embodiment, the state of a peer program may be active, idle, or inactive.

In an alternative embodiment, the functional capabilities of a peer program may include the ability to perform and respond to item searches, the ability to provide instant messaging services, the ability to provide a chat service, an email service, or other communication services as will be known to those having skill in the art. Additionally, a peer program may have the ability to accept and process credit card payments, or manage and complete an auction including a plurality of bidding parties.

Additionally, entity 10 may have several marketplaces defined. In one embodiment, there may be three separate marketplaces dynamically defined by entity 10. For example, definition 160, definition 170, and definition 180. Definition 160 may represent a marketplace for baseball cards, whose numeric category may be 667. Entity 10 may desire to buy, sell, or trade baseball cards within this marketplace with no other restrictions. Definition 170 may represent a marketplace for football cards, whose numeric category may be 668. Entity 10 may desire to buy, sell, or trade football cards within this marketplace with no other restrictions. Definition 180 may represent a marketplace for hockey cards, whose numeric category may be 669. Entity 10 may desire to buy, sell, or trade hockey cards within this marketplace with no other restrictions.

Fig. 5A is a block diagram illustrating an example marketplace definition and related items of an entity participating in a dynamic distributed marketplace.

Continuing the example, definition 160 may have several items in the marketplace.

For example item 162 may be an item in the baseball cards marketplace, category

- 5 667. This item may be a Mickey Mantel rookie card that entity 10 desires to sell for \$1,500 or possibly trade it. Item 164 may be a second item in the baseball cards marketplace. This second item may be a Babe Ruth card from the early years when Ruth was playing for the Boston Red Sox. Entity 10 may desire to buy this particular item for a maximum price of \$2,500 or perhaps trade for it.

- 10 Fig. 6 is a block diagram illustrating an example profile and related marketplace definitions of an entity with three peer programs participating in a dynamic distributed marketplace. In one embodiment, profile 200 may relate to entity 20. Profile 200 may contain certain information about entity 20, for example, the name, city, and state. Profile 200 may additionally contain the type of entity,
- 15 group, association, email address, and alternate contact for entity 20. For example, entity 20 may be a collector located in San Diego, California that may be communicated with via email at the email address cards@base.ball.

- Entity 20 may also have several peer program profiles, one profile for each peer program that entity 20 has initiated. For example, profile 202 may be a peer
- 20 program that is conducting an auction on behalf of entity 20. Profile 204 may be a peer program that is attempting to purchase or trade baseball cards and profile 206 may be a peer program that is attempting to purchase a used automobile. In one embodiment, a peer program that has the item search function is capable of searching other peer programs for specific items and may also be searched by other
- 25 peer programs for specific items.

- Additionally, entity 20 may have several marketplaces defined. In one embodiment, there may be two separate marketplaces dynamically defined by entity 20. For example, definition 210 and definition 220. Definition 210 may represent a marketplace for baseball cards, category 667. Entity 20 may desire to buy, sell, or
- 30 trade baseball cards within this marketplace with the added restriction that all other parties in the marketplace are in San Diego. Definition 220 may represent a marketplace for football cards, category 668. Entity 20 may desire to buy, sell, or

trade football cards within this marketplace with the added restriction that all other parties in the marketplace are in San Diego.

Fig. 6A is a block diagram illustrating an example marketplace definition and related items of an entity participating in a dynamic distributed marketplace.

- 5 Keeping with the same example, definition 210 may have several items in the baseball card marketplace. For example item 212 may be the first item in the marketplace. This first item may be a Mickey Mantel rookie card that entity 20 desires to buy for a maximum price of \$1,500 or possibly trade for it. Item 214 may be the second item in the baseball cards marketplace. This second item may be a Babe Ruth card from the early years when Ruth was playing for the Boston Red Sox. Entity 20 may desire to sell this particular item for \$2,400 or perhaps trade it.

- 10 In one embodiment these two entities with complementary interests may be brought together through facilitation server 80 in order to facilitate a peer-to-peer exchange between the entities. Fig. 7 is a flowchart illustrating an example process for an entity to dynamically create a marketplace for delivery to facilitation server 80 and inclusion in a dynamically created exchange. The process may start in step 230 during which an entity gains access to a device. For example, entity 10 may have access to device 10B. Upon gaining access, entity 10 may launch a peer program, as illustrated in step 232. For example, entity 10 may launch peer 10A.

- 20 Once the peer program is up and running, an entity may update its profile, as seen in step 234, to correctly reflect the entity's information that is germane to the marketplace. In step 236 the entity may create the marketplace. For example, entity 10 may create the marketplace for baseball cards, as previously discussed with respect to Fig. 5. Once a marketplace has been defined, individual items within that marketplace may be entered, as illustrated in steps 238 and 240. If additional marketplaces are desired, the process may be repeated as seen in step 242. The process completes in step 244 when all desired marketplaces have been defined and the items for each marketplace have been entered.

- 25 Once a marketplace has been created, it may be sent to the facilitation server 80 for inclusion in database 85 and to determine complementary interests. Fig. 8 is a flowchart illustrating an example process for sending a dynamically defined marketplace to a facilitation server. The process begins in step 250 once a

marketplace or more than one marketplace has been defined at the peer. For example, entity 10 may define several marketplaces in peer 10A. In step 252, the device running the peer may connect to the facilitation server. For example, device 10B (where peer 10A is running) may connect to facilitation server 80.

- 5 Once connected, in step 254 a peer may provide a marketplace definition to the facilitation server for inclusion in the server's database. Additional marketplaces may also be provided to the facilitation server, as illustrated in step 256. Once each of the marketplaces have been provided to the facilitation server, the process may be complete, as seen in step 258. For example, peer 10A, once device 10B has
- 10 connected to facilitation server 80, may provide each marketplace defined by entity 10 to facilitation server 80. In one embodiment, items that belong to each marketplace are not sent to facilitation server 80. Rather, that information may be maintained by peer 10A at device 10B.

- At the facilitation server, marketplace definitions may be received and stored
- 15 in memory for comparison with other marketplace definitions in order to find complementary definitions. Fig. 9 is a flowchart illustrating an example process for dynamically creating an exchange between two entities with complementary marketplace definitions. The process may start in step 260 when a facilitation server is initialized and prepared to receive connections for remote peers. In step 262, the
- 20 facilitation server may wait to receive a connection. When a connection is received, the facilitation server may receive a marketplace definition from the connected peer, as illustrated in step 264.

- For example, peer 10A may connect to facilitation server 80 and provide several marketplace definitions dynamically created and encoded by entity 10.
- 25 Facilitation server 80, after accepting the connection from device 10B, may receive the several marketplace definitions from peer 10A one at a time or all at once.

- Marketplace definitions that have been received from a connected peer may be stored in the facilitation server's database in step 266. As shown instep 268, the database may then be queried to determine if any complementary marketplace
- 30 definitions exist. If complementary definitions exist, as seen in step 270, contact information for the corresponding entity may be provided to the peer, as illustrated in step 272. If no complementary definitions are located, additional marketplace

definitions may be provided by the peer in step 274. When all marketplace definitions have been provided by the peer, in step 276 the connection with the facilitation server may be closed.

For example, after receiving a marketplace definition from peer 10A, facilitation server 80 may store the definition in volatile memory while it searches database 85 for complementary marketplace definitions. If none are found, facilitation server 80 may move the definition from memory to long term storage in database 85. If complementary definitions are found, facilitation server 80 may provide contact information to peer 10A prior to moving the definition to database 85. Alternatively, facilitation server 80 may process each marketplace definition, respond to all complementary entries, and close the connection with peer 10A prior to moving the marketplace definitions to database 85.

In one embodiment, all marketplace definitions may be provided to facilitation server 80 prior to any queries being made for complementary marketplaces in database 85. Such an arrangement, for example, may advantageously optimize the flow of data communications between peer 10A and facilitation server 80. Additionally, the operations of facilitation server 80 may be optimized such that facilitation server 80 may handle a maximum number of continuous connections from various peers. Marketplace definitions may also remain with the peer and may be subsequently made available to other peers during peer-to-peer communication.

Once a peer has been provided with contact information for an entity with a complementary interest in a dynamically defined marketplace, the peer may be instructed to establish peer-to-peer contact with the other party. Fig. 10 is a flowchart illustrating an example process for establishing peer-to-peer interaction between two entities with complementary interests in a dynamically defined marketplace. The process may begin in step 280 prior to a peer program receiving contact information from the facilitation server, as illustrated in step 282.

In one embodiment, once a peer has received contact information, in step 284 the peer may query the other peers to verify and refine the marketplace. For example, when peer 10A receives contact information for entity 20, peer 10A may contact peer 20A to refine the marketplace. The contact information that peer 10A

receives may be the IP address for device 20B. Upon contacting peer 20A at device 20B, peer 10A may submit a query to determine what items peer 20AB may have associated with the marketplace. Referring back to Figs. 5, 5A, 6, and 6A, peer 10A may query peer 20A to determine if entity 20 is seeking to buy a Mickey Mantel
5 rookie card.

To make a query that refines the marketplace, a peer must first establish peer-to-peer contact with the other peer. In step 286 a peer initiates peer-to-peer contact so that the entities controlling the peers may interact, as illustrated in step 288. When the entities complete their peer-to-peer interaction, the process
10 completes, as seen in step 290.

In one embodiment the interaction between entities may be through a peer program that has been enabled with a chat function and an item search. For example, referring back to Figs. 5 and 6, peer 10A and peer 20A may each have a peer program that is enabled with the chat function and item search function. This
15 information may be determined by peer 10A and peer 20A and reported to entity 10 and entity 20. The two entities may then use their respective chat functions to establish a connection with each other that is channeled through peer 10A and peer 20A. Such a connection may advantageously provide the entities with an efficient method of peer-to-peer interaction in their dynamic exchange.

In one embodiment, the two peer programs may not have equivalent functions to facilitate communication between the entities. In such an example, the peer programs may determine an alternate contact from the entity profile (e.g. profile 200) for the entity. For example, entity 10 may prefer email at a personal account as
20 an alternate contact method.

In an alternative embodiment, a primary peer program may consult facilitation server 80 to determine additional or secondary peer programs that may be active for the particular entity. For example, an entity may have a secondary peer program that is enabled with the chat or instant messaging function. The primary
25 peer program that receives this information from the facilitation server 80 may then attempt to contact that entity through the secondary peer program's chat function.

Additionally, peer-to-peer communication may be facilitated by standardized protocols. Communication between peer programs may enable the exchange of
30

information between peer programs. For example, certain forms of communication between peers, such as peer 10A querying peer 20A to refine a particular marketplace, may adhere to a standard protocol that may be defined at facilitation server 80.

5 Fig. 11 is a block diagram illustrating a protocol layering principle widely used in TCP/IP networking environments. Messages passed from a first computer to a second computer may first travel down the protocol layers of the first computer, then travel across a network, and then travel up the protocol layers of the second computer.

10 For example, a communication from an application running on a first computer originates in application layer 300. This communication may be passed by the application as message 302 to the transport layer 304. The transport layer 304 may pass the message 302 as packet 306 to the internet layer 308. The internet layer 308 may then pass the packet 306 as datagram 310 to the network interface layer 312. The network interface layer 312 may then pass the datagram 310 as network
15 specific frame 314 to the physical network 316.

The network specific frame 314 may travel across the physical network 316 or across multiple physical networks 316 to its destination in a second computer. Upon reaching its destination, the identical frame 314 may be received at the
20 network interface layer 312. The network interface layer 312 may then pass the frame 314 as datagram 310 to the internet layer 308. The internet layer 308 may then pass the datagram 310 as packet 306 to the transport layer 304. The transport layer 304 may then pass the packet 306 as message 302 to application layer 300 where the message is received as a communication in an application. Frame 314,
25 datagram 310, packet 306 and message 302 are identical when traveling between the protocol layers in a TCP/IP networking environment.

Fig. 12 is a flow diagram illustrating a technique for demultiplexing incoming data packets, or frames, based on a protocol type found in the frame header. Communication protocols employ multiplexing and demultiplexing
30 techniques between protocol layers in TCP/IP networking environments. For example, when sending a communication, the source computer may include additional information such as the message type, originating application, and

protocols used. Eventually, all messages are placed into network frames for transfer and combined into a stream of data packets. At the receiving end, the destination computer uses the additional information in the network frame to guide the processing of the communication.

- 5 For example, in step 320, a frame arrives at the destination computer. Once the frame has been received, the frame is parsed to determine the frame's particular type, as illustrated in step 322. A frame may be one of a variety of frame types. Example frame types include, but are not limited to, address resolution protocol ("ARP"), internet protocol ("IP"), and reverse address resolution protocol ("RARP").

- 10 Once the frame type has been determined, the content of the frame is passed to a module that is capable of processing the datagram. For example, an ARP datagram may be passed to ARP module 324 for processing. Alternatively, if the frame type indicated an IP datagram, the IP datagram may be passed to IP module 15 326 for processing up to the next layer in the protocol stack. Additionally, a RARP datagram may be passed to RARP module 328 for processing.

- Fig. 13 is a flow diagram illustrating a technique for demultiplexing incoming datagrams based on a type found in the IP datagram header. Similar to the processing of frames, IP datagrams may be parsed to determine how to process the particular datagram. For example, in step 330 an IP datagram arrives and is routed 20 to the appropriate module for processing. IP module 326 may parse the datagram to determine the datagram type. Example datagram types include, but are not limited to, internet control message protocol ("ICMP"), user datagram protocol ("UDP"), transport control protocol ("TCP"), and exterior gateway protocol ("EGP").

- 25 Once the datagram type has been determined, IP module 326 may select a protocol handler for the packet included in the datagram. For example, an EGP datagram may be forwarded to EGP handler 332. Similarly, an ICMP datagram may be forwarded to ICMP handler 334 while a TCP datagram may be sent to TCP handler 336 for processing up to the next layer in the protocol stack. Additionally, a 30 UDP datagram may be sent to UDP handler 338 for processing.

Fig. 14 is a flow diagram illustrating a technique for demultiplexing incoming messages based on a type found in the TCP packet header. Similar to the

processing of frames and datagrams, TCP messages may be parsed to determine which application is suited to receive the particular message type. For example, in step 340 a TCP message arrives and is routed to the TCP handler 336 for the appropriate processing. TCP handler 336 may parse the message to determine the message type and the particular originating application.

Example message types include, but are not limited to, hyper text transfer protocol ("HTTP"), file transfer protocol ("FTP"), and simple mail transfer protocol ("SMTP"). An extensive set of applications are commercially available for use with these and other message types. For example, Netscape Navigator and Microsoft Explorer are applications that use HTTP messages; WFTP is an application that uses FTP messages, and Eudora and Microsoft Outlook are applications that use SMTP messages. Additional examples of applications are well known, although not mentioned herein.

Once the message type has been determined by TCP handler 336, the message may be routed to the appropriate application for processing. For example, an HTTP message may be forwarded to HTTP application 342. Similarly, an FTP message may be forwarded to FTP application 344 while an SMTP message may be sent to SMTP application 346 for processing by the application and possibly delivery to an end user.

Fig. 15 is a block diagram illustrating an exemplary computer system 350 in which elements and functionality of the present invention are implemented according to one embodiment of the present invention. The present invention may be implemented using hardware, software, or a combination thereof and may be implemented in a computer system or other processing system. Various software embodiments are described in terms of exemplary computer system 350. After reading this description, it will become apparent to a person having ordinary skill in the relevant art how to implement the invention using other computer systems, processing systems, or computer architectures.

The computer system 350 includes one or more processors, such as processor 352. Additional processors may be provided, such as an auxiliary processor to manage input/output, an auxiliary processor to perform floating point mathematical operations, a special-purpose microprocessor having an architecture suitable for fast

execution of signal processing algorithms ("digital signal processor"), a slave processor subordinate to the main processing system ("back-end processor"), an additional microprocessor or controller for dual or multiple processor systems, or a coprocessor. It is recognized that such auxiliary processors may be discrete processors or may be integrated with the processor 352.

The processor 352 is connected to a communication bus 354. The communication bus 354 may include a data channel for facilitating information transfer between storage and other peripheral components of the computer system 350. The communication bus 354 further provides the set of signals required for communication with the processor 352, including a data bus, address bus, and control bus (not shown). The communication bus 354 may comprise any known bus architecture according to promulgated standards, for example, industry standard architecture (ISA), extended industry standard architecture (EISA), Micro Channel Architecture (MCA), peripheral component interconnect (PCI) local bus, standards promulgated by the Institute of Electrical and Electronics Engineers (IEEE) including IEEE 488 general-purpose interface bus (GPIB), IEEE 696/S-100, and the like.

Computer system 350 includes a main memory 356 and may also include a secondary memory 358. The main memory 356 provides storage of instructions and data for programs executing on the processor 352. The main memory 356 is typically semiconductor-based memory such as dynamic random access memory (DRAM) and/or static random access memory (SRAM). Other semiconductor-based memory types include, for example, synchronous dynamic random access memory (SDRAM), Rambus dynamic random access memory (RDRAM), ferroelectric random access memory (FRAM), and the like, as well as read only memory (ROM).

The secondary memory 358 may include a hard disk drive 360 and/or a removable storage drive 362, for example a floppy disk drive, a magnetic tape drive, an optical disk drive, etc. The removable storage drive 362 may read from and write to a removable storage unit 364 in a well-known manner. Removable storage unit 364 may be, for example, a floppy disk, magnetic tape, optical disk, etc. which may be read from and written to by removable storage drive 362. Additionally, the

removable storage unit 364 may include a computer usable storage medium with computer software and computer data stored thereon.

In alternative embodiments, secondary memory 358 may include other similar means for allowing computer programs or other instructions to be loaded into the computer system 350. Such means may include, for example, interface 370 and removable storage unit 372. Examples of secondary memory 358 may include semiconductor-based memory such as programmable read-only memory (PROM), erasable programmable read-only memory (EPROM), electrically erasable read-only memory (EEPROM), or flash memory (block oriented memory similar to EEPROM). Also included are any other interfaces 370 and removable storage units 372 that allow software and data to be transferred from the removable storage unit 372 to the computer system 350 through interface 370.

Computer system 350 may also include a communication interface 374. Communication interface 374 allows software and data to be transferred between computer system 350 and external devices, networks or information sources. Examples of communication interface 374 include but are not limited to a modem, a network interface (for example an Ethernet card), a communications port, a PCMCIA slot and card, an infrared interface, and the like.

Communication interface 374 preferably implements industry promulgated architecture standards, such as Ethernet IEEE 802 standards, Fibre Channel, digital subscriber line (DSL), asymmetric digital subscriber line (ASDL), frame relay, asynchronous transfer mode (ATM), integrated digital services network (ISDN), personal communications services (PCS), transmission control protocol/Internet protocol (TCP/IP), serial line Internet protocol/point to point protocol (SLIP/PPP), and so on. Software and data transferred via communication interface 374 may be in the form of signals 378 which may be electronic, electromagnetic, optical or other signals capable of being received by communication interface 374. These signals 378 are provided to communication interface 374 via channel 376. Channel 376 carries signals 378 and may be implemented using wire or cable, fiber optics, a phone line, a cellular phone link, a radio frequency (RF) link, or other communications channels.

Computer programming instructions (also known as computer programs, software, or firmware) may be stored in the main memory 356 and the secondary memory 358. Computer programs may also be received via communication interface 374. Such computer programs, when executed, enable the computer system 350 to perform the features of the present invention. In particular, execution of the computer programming instructions may enable the processor 352 to perform the features and functions of the present invention. Accordingly, such computer programs represent controllers of the computer system 350.

In this document, the term "computer program product" is used to refer to any medium used to provide programming instructions to the computer system 350. Examples of certain media include removable storage units 364 and 372, a hard disk installed in hard disk drive 360, and signals 378. Thus, a computer program products may be a means for providing programming instructions to the computer system 350.

In an embodiment where the invention is implemented using software, the software may be stored in a computer program product and loaded into computer system 350 using hard disk drive 360, removable storage drive 362, interface 370 or communication interface 374. The computer programming instructions, when executed by the processor 352, may cause the processor 352 to perform the features and functions of the invention as described herein.

In another embodiment, the invention may be implemented primarily in hardware using, for example, hardware components such as application specific integrated circuits ("ASICs"). Implementation of the hardware state machine so as to perform the functions described herein will be apparent to persons having ordinary skill in the relevant art.

In yet another embodiment, the invention may be implemented using a combination of both hardware and software. It is understood that modification or reconfiguration of the computer system 350 by one having ordinary skill in the relevant art does not depart from the scope or the spirit of the present invention.

While the particular dynamically defined marketplace and distributed exchange herein shown and described in detail is fully capable of attaining the above described objects of this invention, it is to be understood that the description and

drawings represent the presently preferred embodiment of the invention and are, as such, a representative of the subject matter which is broadly contemplated by the present invention. It is further understood that the scope of the present invention fully encompasses other embodiments that may become obvious to those skilled in the art, and that the scope of the present invention is accordingly limited by nothing other than the appended claims.

WHAT IS CLAIMED IS:

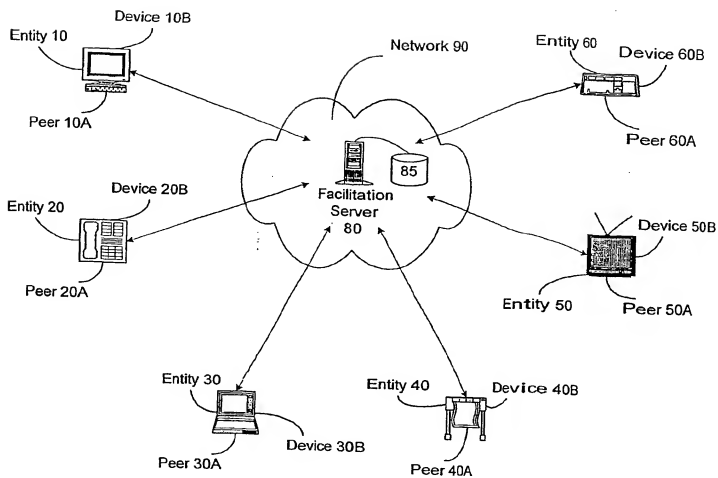
1. A system for facilitating peer-to-peer transactions between a first entity and a second entity wherein a facilitation server is communicatively connected with said first entity and said second entity through a global electronic network, said method comprising:
 - 5 means for said first entity to provide market criteria that define a first marketplace;
 - means for said second entity to provide market criteria that define a second marketplace;
 - 10 means for dynamically creating an exchange by complementary said first marketplace with said second marketplace; and
 - means for providing contact information to allow peer-to-peer interaction between said first entity and said second entity.
2. The system of claim 1 wherein said first marketplace comprises purchasing or acquisition criteria provided by said first entity and said second marketplace comprises selling or distribution criteria provided by said second entity.
- 5 3. The system of claim 1 wherein said contact information is provided upon successfully matching said first marketplace with said second marketplace to dynamically create an exchange.
4. The system of claim 1 wherein said contact information comprises an address on said global electronic network.
- 10 5. The system of claim 1 wherein said exchange comprises a plurality of entities with complementary marketplaces.

6. A method to facilitate peer-to-peer transactions between a first entity and a second entity wherein a facilitation server is communicatively connected with said first entity and said second entity through a global electronic network, said method comprising:
- 5 receiving at said facilitation server market criteria defining a first marketplace from said first entity;
- receiving at said facilitation server a query from said second entity wherein said query is comprised of market criteria defining a second marketplace;
- 10 matching said first marketplace with said second marketplace to dynamically create an exchange for peer-to-peer transactions; and
- providing contact information to allow said first entity and said second entity to interact.
7. The method of claim 6 wherein said first entity and said second entity
- 15 commercially interact through one or more of an acquisition, auction, barter, buy, contract, exchange, investment, negotiation, procurement, purchase, sale, swap, or trade.
8. The method of claim 6 wherein said first marketplace is defined by purchasing or acquisition criteria and said second marketplace is defined by
- 20 selling or distribution criteria to dynamically create said exchange.
9. The method of claim 6 wherein said contact information comprises a network address on said global electronic network.
10. The method of claim 6 wherein said step for matching further comprises determining a plurality of entities with complementary marketplaces.

11. A method to facilitate a peer-to-peer transaction between a first entity with a first peer program and a second entity with a second peer program wherein a facilitation server is communicatively connected with said first peer program and said second peer program through a global electronic network, said
5 method comprising:
 inputting market criteria defining a first marketplace into said first peer program at said first entity;
 sending said first marketplace definition from said first peer program to said facilitation server;
10 inputting market criteria defining a second marketplace into said second peer program at said second entity;
 sending said second marketplace definition from said second peer program to said facilitation server;
 matching said first marketplace with said second marketplace to
15 dynamically create an exchange;
 receiving by said second peer program at said second entity, contact information for said first peer program at said first entity; and
 contacting said first peer program with said second peer program to
initiate peer-to-peer interaction between said first entity and said second
20 entity.
12. The method of claim 11 wherein said receiving step comprises receiving from said facilitation server, contact information for a plurality of entities with complementary marketplaces.
13. The method of claim 11 wherein said first marketplace is defined by
25 purchasing or acquisition criteria and said second marketplace is defined by selling or distribution criteria to dynamically create said exchange.
14. The method of claim 11 wherein said contact information comprises a network address on said global electronic network.

15. A computer program product to facilitate peer-to-peer transactions between a first entity and a second entity wherein a facilitation server is communicatively connected with said first entity and said second entity through a global electronic network, said computer program product comprising:
- 5 instructions for inputting market criteria defining a first marketplace into a first peer program at said first entity;
- instructions for receiving at said facilitation server said first marketplace definition from said first peer program at said first entity;
- 10 instructions for inputting market criteria defining a second marketplace into a second peer program at said second entity;
- instructions for receiving at said facilitation server a query from said second peer program at said second entity wherein said query includes said second marketplace;
- 15 instructions for matching said first marketplace with said second marketplace to dynamically create an exchange for peer-to-peer transactions;
- instructions for said facilitation server to respond to said query by providing contact information; and
- 20 instructions for said second peer program to contact said first peer program to allow said second entity and said first entity to interact.
16. The computer program product of claim 15 further comprising instructions to provide contact information in the form of a network address for said first peer program on said global electronic network.
17. The computer program product of claim 15 wherein said instructions for matching further comprise instructions for determining a plurality of entities with complementary marketplaces.
- 25

18. The computer program product of claim 17 further comprising instructions for said second peer program to contact one or more of said plurality of entities to facilitate peer-to-peer transactions.
19. The computer program product of claim 18 wherein said first marketplace comprises purchasing or acquisition criteria provided by said first entity and
5 said second marketplace comprises selling or distribution criteria provided by said second entity.

**Fig. 1**

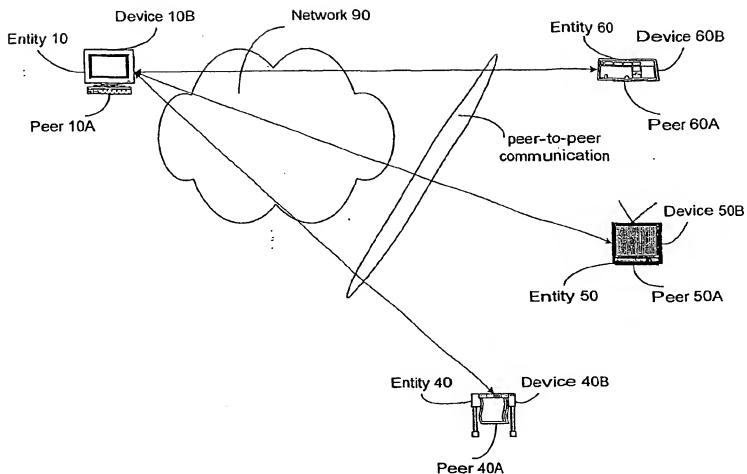


Fig. 2

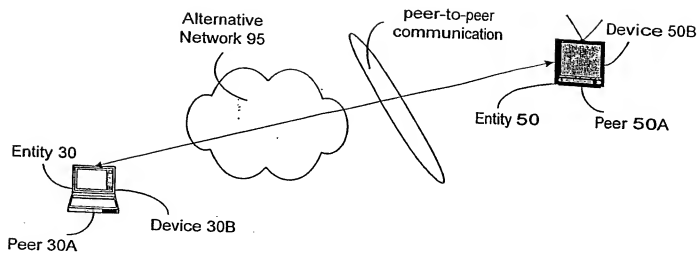


Fig. 3

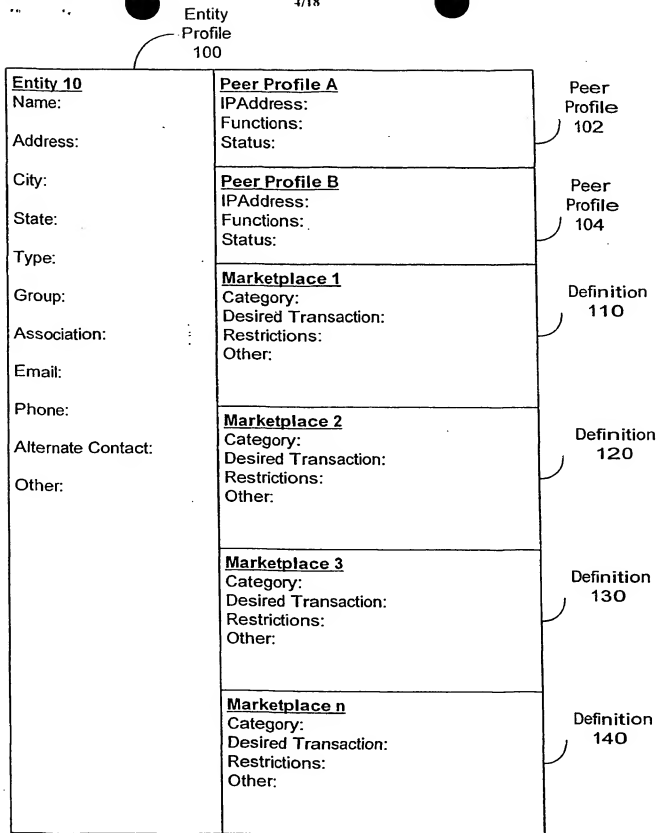


Fig. 4

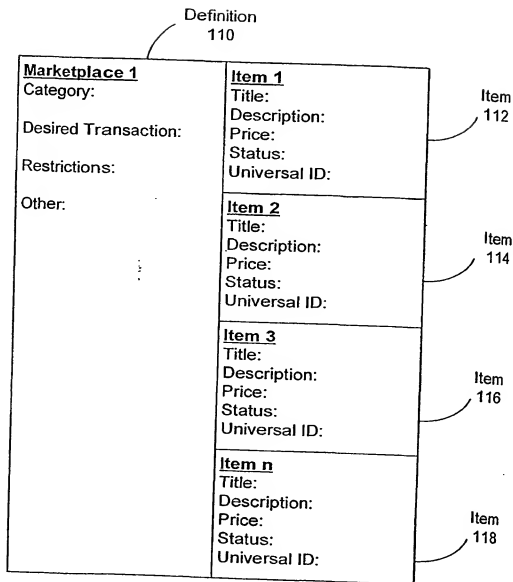


Fig. 4A

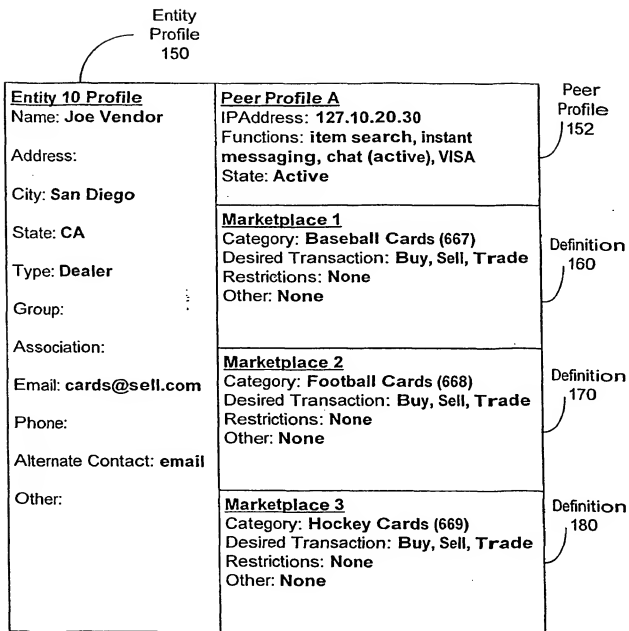


Fig. 5

Definition 160	
<u>Marketplace 1</u> Category: Baseball Cards (667) Desired Transaction: Buy, Sell, Trade Restrictions: None Other: None	<u>Item 1</u> Title: Mickey Mantel Description: rookie card Price: \$1,500 Status: sell or trade Universal ID: <u>Item 2</u> Title: Babe Ruth Description: Boston Red Sox Price: \$2,500 Status: buy or trade Universal ID:
	Item 162
	Item 164

Fig. 5A

<p>Entity 20 Name: Joe Wheeler Address: City: San Diego State: CA Type: Collector Group: Association: Email: cards@base.ball Phone: Alternate Contact: email Other:</p>	<p>Peer Profile A IPAddress: 127.10.20.40 Functions: item search, instant messaging, chat (inactive), PGP State: Active</p>	<p>Peer Profile 202</p>
	<p>Peer Profile B IPAddress: 127.10.20.50 Functions: item search, chat (active), email State: Active</p>	<p>Peer Profile 204</p>
	<p>Peer Profile C IPAddress: 127.10.20.60 Functions: item search, instant messaging State: Inactive</p>	<p>Peer Profile 206</p>
	<p>Marketplace 1 Category: Baseball Cards (667) Desired Transaction: Buy, Sell, Trade Restrictions: City=San Diego Other: None</p>	<p>Definition 210</p>
	<p>Marketplace 2 Category: Football Cards (668) Desired Transaction: Buy, Sell, Trade Restrictions: City=San Diego Other: None</p>	<p>Definition 220</p>

Fig. 6

Definition 210	
<u>Marketplace 1</u> Category: Baseball Cards (667) Desired Transaction: Buy, Sell, Trade Restrictions: City=San Diego Other: None	<u>Item 1</u> Title: Mickey Mantel Description: rookie card Price: \$1,500 Status: buy or trade Universal ID: <u>Item 2</u> Title: Babe Ruth Description: Boston Red Sox Price: \$2,400 Status: sell or trade Universal ID:
	Item 212
	Item 214

Fig. 6A

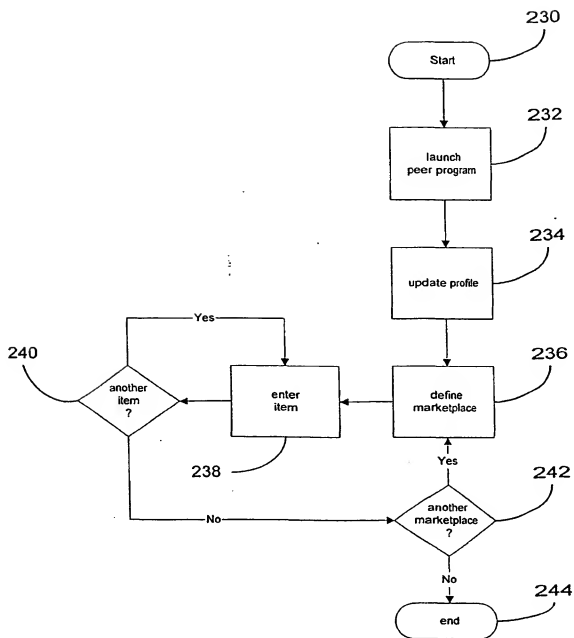


Fig. 7

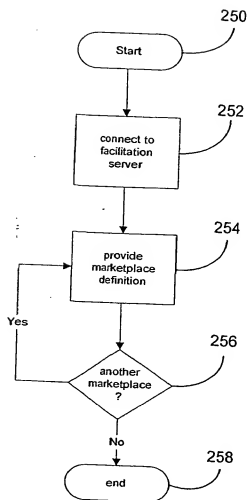


Fig. 8

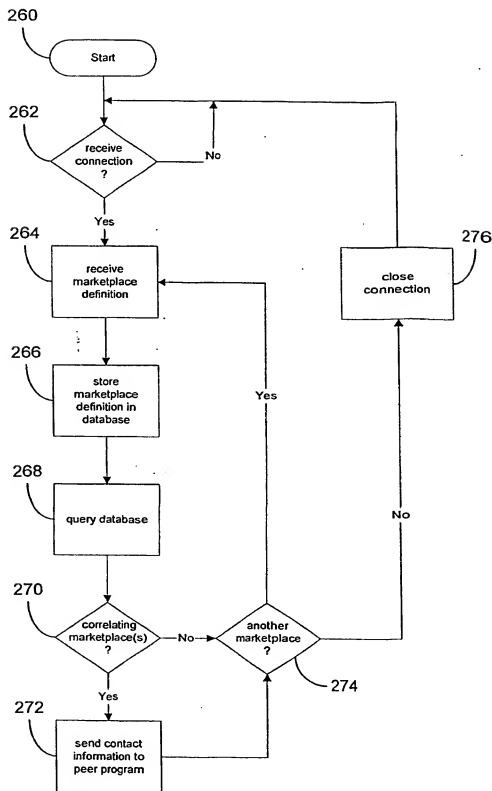


Fig. 9

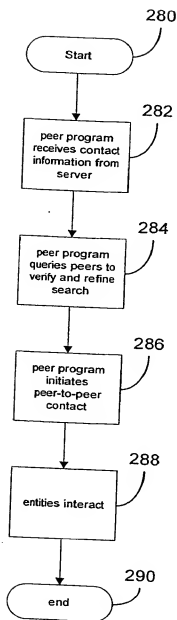


Fig. 10

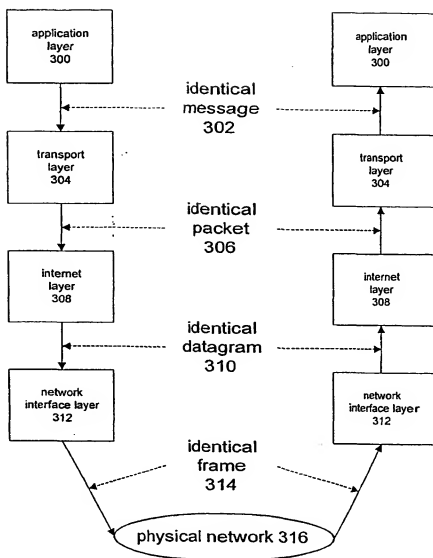


Fig. 11

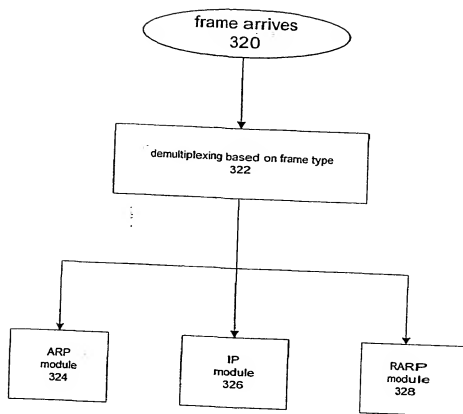
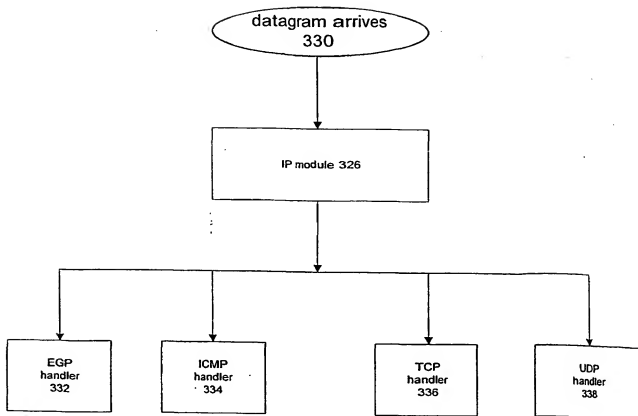


Fig. 12

**Fig. 13**

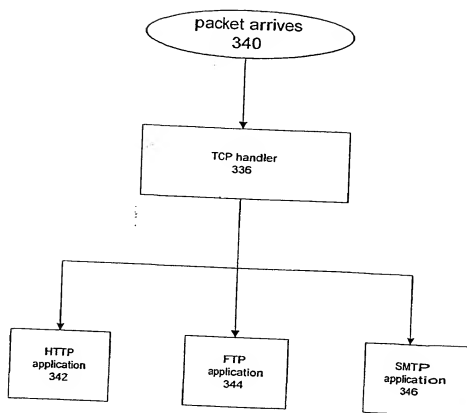
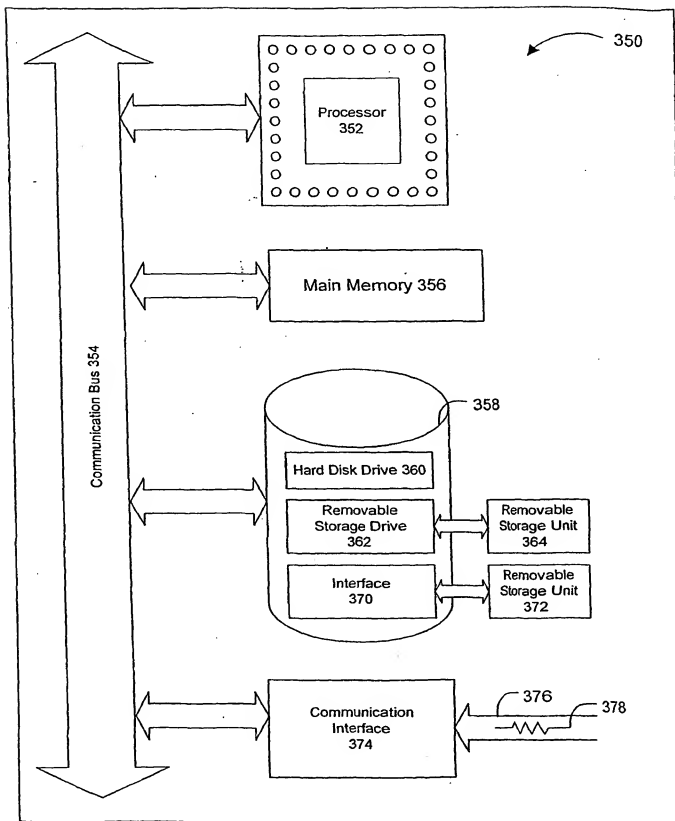


Fig. 14

**Fig. 15**

PATENT COOPERATION TREATY

PCT

DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT

(PCT Article 17(2)(a), Rules 13ter.1(c) and Rule 39)


Applicant's or agent's file reference 255/196WO	IMPORTANT DECLARATION	Date of mailing(day/month/year) 30/10/2001
International application No. PCT/US 01/ 23588	International filing date(day/month/year) 26/07/2001	(Earliest) Priority date(day/month/year) 04/08/2000
International Patent Classification (IPC) or both national classification and IPC GO6F17/60		
Applicant EYE STATE, INC.		

This International Searching Authority hereby declares, according to Article 17(2)(a), that no international search report will be established on the international application for the reasons indicated below

1. ☒ The subject matter of the international application relates to:
 - a. ☐ scientific theories.
 - b. ☐ mathematical theories
 - c. ☐ plant varieties.
 - d. ☐ animal varieties.
 - e. ☐ essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes.
 - f. ☒ schemes, rules or methods of doing business.
 - g. ☐ schemes, rules or methods of performing purely mental acts.
 - h. ☐ schemes, rules or methods of playing games.
 - i. ☐ methods for treatment of the human body by surgery or therapy.
 - j. ☐ methods for treatment of the animal body by surgery or therapy.
 - k. ☐ diagnostic methods practised on the human or animal body.
 - l. ☐ mere presentations of information.
 - m. ☐ computer programs for which this International Searching Authority is not equipped to search prior art.
2. ☐ The failure of the following parts of the international application to comply with prescribed requirements prevents a meaningful search from being carried out:

☐ the description
 ☐ the claims
 ☐ the drawings
3. ☐ The failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions prevents a meaningful search from being carried out:

☐ the written form has not been furnished or does not comply with the standard.
 ☐ the computer readable form has not been furnished or does not comply with the standard.
4. Further comments:

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Lucia Van Pinxteren
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Form PCT/ISA/203 (July 1998)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 203

The claims relate to subject matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search

examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see Guidelines Part B Chapter VIII, 1-6).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

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